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Biological
Sciences

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GRADUATE DIVISIONS
LOYOLA UNIVERSITY BULLETIN
ANNOUNCEMENTS 1967-1968

New Orleans, La.

January, 1967

GRADUATE DIVISIONS
of
Arts and Sciences
Business Administration

Member of the American Association of Collegiate Schools of Business.

Member of the Southern Association of Colleges and Secondary Schools.

Member of the National Catholic Educational Association.

Member of the Jesuit Educational Association.

Member of the Association of American Colleges.

Member of American Association of Colleges for Teacher Education.

Accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary teachers, secondary teachers, and principals leading to the Bachelor's or the Master's degree.

Approved for Teacher Education by the Louisiana State Board of Education.

Loyola University, Incorporated April 15, 1912. Authorized to grant degrees by The General Assembly of Louisiana for the year 1912.

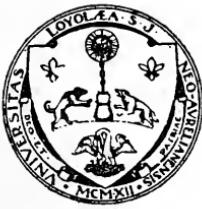
The Legal and Corporate Title of the University is
"LOYOLA UNIVERSITY, NEW ORLEANS"

All donations, endowments, legacies, bequests, etc., should be made under this title.

Cover Design: WILLIAM TOYE

Ad Majorem Dei Gloriam

Loyola University



GRADUATE DIVISIONS

1967 - 1968

6363 ST. CHARLES AVENUE
NEW ORLEANS, LA. 70118
UNIVERSITY 6-5471

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DAVID G. KEIFFER, PH.D., *Chairman, Physics Department*

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Academic Calendar

1967

May	13	Deadline for submission of graduate applications and credentials for the Summer Session.
	20	Graduate admissions examination.
June	10	Registration for MBA program (8:30 A.M. to 12 Noon).
	12-13	Registration for Summer Session.
	14	Classes begin.
July	4	Independence Day. University Holiday.
	26	Six week session ends.
August	3	Three week session begins.
	12	Deadline for submission of graduate applications and credentials for Fall Semester.
	15	Feast of the Assumption. University Holiday.
	24	Three week session ends.
	26	Graduate admissions examination.
	31	Registration for 60-hour MBA program (6:00-9:00 P.M.).
September	4	Labor Day. University Holiday.
	5	Official opening of Fall Semester.
	9	Registration for graduate divisions.
	11	Graduate lectures and classes begin.
	15	Latest date for changes or official dropping of courses. (Grades of WP or WF will be given in those courses dropped after this date.)
November	1	All Saints' Day. University Holiday.
	22	Thanksgiving holidays begin after last class.
	27	Classes resumed.

December 8 Feast of the Immaculate Conception. University Holiday.

15-22 Final Examinations. Christmas Holidays begin after last exam.

16 Deadline for submitting applications and credentials for Spring Semester.

16 Graduate admissions examination.

22 End of Fall Semester.

1968

January 4 Registration for 60-hour MBA program (6:00-9:00 P.M.).

13 Registration for graduate divisions.

15 Classes begin for Spring Semester.

22 Latest date for changes or official dropping of courses. (Grades of WP or WF will be given in those courses dropped after this date.)

February 1 Latest date for application for candidates for degrees conferred in June 1968. Graduation fees due.

26-28 Mardi Gras. University Holidays.

April 10 Easter holidays begin after last class.

17 Classes resumed.

29-3 Graduate examinations.

May 13 Baccalaureate Mass, 5:00 P.M.

14 Commencement exercises, 8:00 P.M.

Close of academic year.

1967

CALENDAR

1967

JANUARY							APRIL							JULY							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7	—	—	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	—	7
8	9	10	11	12	13	14	2	3	4	5	6	7	8	2	3	4	5	6	7	8	8	9	10	11	12	13	14
15	16	17	18	19	20	21	9	10	11	12	13	14	15	9	10	11	12	13	14	15	15	16	17	18	19	20	21
22	23	24	25	26	27	28	16	17	18	19	20	21	22	16	17	18	19	20	21	22	22	23	24	25	26	27	28
29	30	31	—	—	—	—	23	24	25	26	27	28	29	23	24	25	26	27	28	29	29	30	31	—	—	—	—
—	—	—	—	—	—	—	30	—	—	—	—	—	30	31	—	—	—	—	—	—	—	—	—	—	—	—	—
FEBRUARY							MAY							AUGUST							NOVEMBER						
—	—	1	2	3	4	—	—	1	2	3	4	5	6	—	—	1	2	3	4	5	—	—	—	1	2	3	4
5	6	7	8	9	10	11	7	8	9	10	11	12	13	6	7	8	9	10	11	12	5	6	7	8	9	10	11
12	13	14	15	16	17	18	14	15	16	17	18	19	20	13	14	15	16	17	18	19	12	13	14	15	16	17	18
19	20	21	22	23	24	25	21	22	23	24	25	26	27	20	21	22	23	24	25	26	19	20	21	22	23	24	25
26	27	28	—	—	—	—	28	29	30	31	—	—	—	27	28	29	30	31	—	—	26	27	28	29	30	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MARCH							JUNE							SEPTEMBER							DECEMBER						
—	—	1	2	3	4	—	—	—	—	1	2	3	—	—	—	—	—	1	2	—	—	—	—	1	2	—	
5	6	7	8	9	10	11	4	5	6	7	8	9	10	3	4	5	6	7	8	9	3	4	5	6	7	8	9
12	13	14	15	16	17	18	11	12	13	14	15	16	17	10	11	12	13	14	15	16	10	11	12	13	14	15	16
19	20	21	22	23	24	25	18	19	20	21	22	23	24	17	18	19	20	21	22	23	17	18	19	20	21	22	23
26	27	28	29	30	31	—	25	26	27	28	29	30	—	24	25	26	27	28	29	30	24	25	26	27	28	29	30
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31	—	—	—	—	—	—

1968

C A

1968

Faculty

GRADUATE DIVISION, BIOLOGICAL SCIENCES

REV. JOHN H. MULLAHY, S.J., PH.D., *Professor of Biology; Chairman of the Department of Biological Sciences and Graduate Division.*
A.B., St. Louis University, 1937; M.S., Fordham University, 1941;
S.T.L., St. Louis University, 1946; Ph.D., Vanderbilt University, 1951.

JOHN G. ARNOLD, JR., PH.D., *Professor of Biology; Chairman of the Department of Medical Technology.*
A.B., Ohio State University, 1930; A.M., Wesleyan University, 1932;
Ph.D., New York University, 1934.

E. LETITIA BEARD, PH.D., *Associate Professor of Physiology.*
B.A., Texas Christian University, 1952; B.S., *ibid.*, 1953; A.S.C.P. Registry, 1953; M.S., Texas Christian University, 1955; Ph.D., Tulane University, 1961.

KAMEL T. KHALAF, PH.D., *Associate Professor of Entomology.*
B.S., Baghdad University, 1945; M.S., University of Oklahoma, 1949;
Ph.D., University of Oklahoma, 1952.

JOHN T. McHALE, PH.D., *Assistant Professor of Plant Physiology.*
B.S., Iona College, 1955; Ph.D., University of Texas, 1961.

WALTER G. MOORE, PH.D., *Professor of Comparative Anatomy and Ecology.*
A.B., Wayne University, 1934; A.M., University of Minnesota, 1938;
Ph.D., *ibid.*, 1940.

JAGDISH M. UPADHYAY, PH.D., *Assistant Professor of Bacteriology.*
B.S., Gujarat University (India), 1951; M.S., University of Michigan, 1957;
Ph.D., Washington State University, 1963.

GRADUATE DIVISION, COLLEGE OF BUSINESS ADMINISTRATION

G. RALPH SMITH, PH.D., *Assistant Dean and Director of the Graduate Division of the College of Business Administration; Professor of Management.*
B.S., Hamilton College, 1937; M.S., Syracuse University, 1940;
Ph.D., *ibid.*, 1954.

KARL ASHBURN, PH.D., *Professor of Economics and Finance.*
B.A., Texas Christian University, 1926; M.B.A., *ibid.*, 1928;
Ph.D., Duke University, 1934.

WILLIAM P. CARR, M.B.A., *Professor of Accounting.*
B.B.A., University of Texas, 1931; M.B.A., *ibid.*, 1934; Texas C.P.A., 1934;
Louisiana C.P.A., 1939; F.P.C.A., 1947.

RUDOLPH COPER, PH.D., *Professor of Finance and Economics.*
Ph.D., Friedrich Wilhelms Universitaet, Berlin, 1930.

GEORGE FIRZLY, (PH.D. Cand., University of Utah), *Assistant Professor of Economics.*
L.L.B., Syrian University, Demascus, 1948; B.A., Los Angeles State College, 1953; Graduate Certificate Middle Eastern Studies, University of Utah, 1964.

IRVING A. FOSBERG, PH.D., *Associate Professor of Marketing.*
B.S., New York University, 1937; M.A., Columbia University, 1938;
Ph.D., New York University, 1940.

G. WALLACE LEFTWICH, M.B.A., *Professor of Accounting.*
B.S., Loyola University, New Orleans, 1947; M.B.A., Tulane University, 1950; Louisiana C.P.A., 1949.

ARTHUR L. RAYHAWK, PH.D., *Professor of Marketing.*
 A.B., Regis College, 1925; M.A., The Catholic University of America, 1927;
 Ph.D., *ibid*, 1932.

REV. HUBERT F. SCHIFFER, S.J., PH.D., *Professor of Economics.*
 A.B., St. Miki College, Tokyo, Japan; M.A., Fordham University, 1952;
 Ph.D., *ibid*, 1958.

THERESA R. SHAPIRO, PH.D., *Associate Professor of Economics and Statistics.*
 B.A., Hunter College, 1932; M.A., Columbia University, 1933;
 Ph.D., *ibid*, 1955.

REV. JACQUES E. YENNI, S.J., PH.D., *Professor of Economics.*
 B.S. in Ec., Loyola University, New Orleans, 1930; M.A., St. Louis University, 1936; Ph.D., University of California, 1949.

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 B.S., Loyola University, Chicago, 1937; M.A., Catholic University of America, 1941; Ed.D., Temple University, 1950.

REV. ROBERT ALCIATORE, S.J., PH.D., *Assistant Professor of Education.*
 A.B., Spring Hill College, 1954; S.T.L., St. Louis University, 1962; Ph.D., University of Minnesota, 1965.

SAMPSON P. BORDELON, PH.D., *Lecturer in Education.*
 B.S., St. Mary's University of San Antonio, 1949; M.Ed., Louisiana State University, 1953; Ph.D., University of Southern Mississippi, 1966.

ANNE BRANLEY, M.A., *Visiting Lecturer in Education.*
 B.S., Loyola University, New Orleans, 1951; M.A., *ibid.*, 1953.

BROTHER CLEMENT COSGROVE, S.C., PH.D., *Associate Professor of Education.*
 Ph.B., Loyola University, New Orleans, 1935; M.S., Fordham University, 1951; Ph.D., *ibid.*, 1955.

ROBERT L. CURRY, PH.D., *Visiting Lecturer in Education.*
 B.A., Oklahoma University, 1954; Ed.M., Central State College, 1956; Ph.D., Oklahoma University, 1960.

HENRY HELM, M.A., *Visiting Lecturer in Education.*
 B.S., Tulane University, 1948; M.A., *ibid.*, 1959.

MARGARET HYMEL, M.A., *Visiting Lecturer in Education.*
 B.A., Tulane University, 1939; M.A., Louisiana State University, 1942.

SISTER MARY OF THE DIVINE HEART LANE, S.B.S., PH.D., *Visiting Lecturer in Education.*
 B.S., Villanova University, 1947; M.A., Catholic University, 1959; Ph.D., *ibid.*, 1962.

ANTHONY SAVOCA, PH.D., *Visiting Lecturer in Education.*
 B.S., Tulane University, 1949; M.S., Loyola University, New Orleans, 1954; Ph.D., Louisiana State University, 1965.

HILDA CHIARULLI SMITH, PH.D., *Associate Professor of Education.*
 B.S., Syracuse University, 1941; M.A., *ibid.*, 1947; Ph.D., *ibid.*, 1955.

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 B.A., Tulane University, 1939; M.Ed., Louisiana State University, 1954; Ed.D., Harvard, 1954.

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 B.S., St. Viator College, 1937; M.A., Loyola University, Chicago, 1940; M.A., University of Chicago, 1947; Ph.D., Fordham University, 1949.

BLANCHE PHYLLIS ZINK, PH.D., *Assistant Professor of Education.*
 B.A., Southern Methodist University, 1948; M.A., *ibid.*, 1949; Ph.D., The University of Texas, 1965.

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 B.S., University of Denver, 1947; M.S., *ibid.*, 1951; Ph.D., The Johns Hopkins University, 1955.

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 B.S., Notre Dame University, 1944; M.A., Indiana State University, 1946; M.S., University of Tennessee, 1950; Ph.D., *ibid.*

WINSTON R. DEMONSABERT, PH.D., *Professor of Chemistry.*
 B.S., Loyola University, New Orleans, 1937; A.M., Tulane University, 1945; Ph.D., *ibid.*, 1952.

ANTHONY DIMAGGIO, III, PH.D., *Associate Professor of Biochemistry; Assistant Chairman of the Department.*
 B.S., Loyola University, New Orleans, 1956; Ph.D., Louisiana State University, 1961.

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 A.B., Gonzaga University, 1938; A.M., *ibid.*, 1939; M.S., Fordham University, 1941; S.T.L., St. Louis University, 1946; Ph.D., Princeton University, 1951.

FRANK KOMITSKY, JR., PH.D., *Assistant Professor of Chemistry.*
 B.S., Grove City College, 1960; Ph.D., The Ohio State University, 1964.

ROBERT C. PETTERSON, PH.D., *Associate Research Professor of Chemistry.*
 B.S., University of Maine, 1947; Ph.D., University of Southern California, 1957.

REV. ROBERT RATCHFORD, S.J., PH.D., *Assistant Professor of Chemistry.*
 B.S., Spring Hill College, 1953; Ph.D., The Catholic University of America, 1958.

MARGARITA ROMILLO, Doctor in Chemical Science, *Instructor of Chemistry.*
 Bachiller-en Cienias-y-Letras, Instituto-de-la Vibora, 1949; Doctor in Chemical Science, University of Havana, 1956.

JASJIT S. WALIA, PH.D., *Associate Professor of Chemistry.*
 B.S.Honors, Punjab University, India, 1955; M.S.Honors, ibid., 1956; Ph.D., University of Southern California, 1960.

RICHARD S. WENDT, PH.D., *Associate Professor of Chemistry.*
 A.B., Washington University, St. Louis, 1954; Ph.D., University of Wisconsin, 1960.

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 B.S., Spring Hill College, 1941; M.S., St. Louis University, 1945.

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 B.S., Spring Hill College, 1958; Ph.D., Harvard, 1963.

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 B.S., Loyola University, New Orleans, 1933; A.M., Tulane University, 1942.

REV. BERNARD A. TONNAR, S.J., M.A., *Associate Professor of Mathematics.*
 A.B., St. Louis University, 1937; A.M., The Catholic University of America, 1940; S.T.L., St. Louis University, 1946.

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 B.S., Tulane University, 1945; Ph.D., Catholic University, 1961.

RAY H. WITHAM, B.A., *Assistant Professor of Mathematics.*
 B.A., Illinois College, 1945.

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 B.S., Loyola University, New Orleans, 1952; M.S., University of Notre Dame, 1953; Ph.D., ibid., 1956.

REV. FRANCIS A. BENEDETTO, S.J., PH.D., *Professor of Physics; Executive Assistant to the President.*
 A.B., St. Louis University, 1936; M.S., Fordham University, 1940; Ph.D., ibid., 1946.

CARL H. BRANS, PH.D., *Assistant Professor of Physics.*
 B.S., Loyola University, New Orleans, 1957; Ph.D., Princeton University, 1961.

REV. JAMES C. CARTER, S.J., PH.D., *Assistant Professor of Physics.*
 B.S., Spring Hill College, 1952; M.S., Fordham University, 1953; Ph.D., The Catholic University of America, 1956; S.T.L., Woodstock College, 1959.

HENRY A. GARON, M.S., *Assistant Professor of Physics.*
 B.S., Loyola University, New Orleans, 1947; M.S., University of Notre Dame, 1950.

CRESTON A. KING, JR., PH.D., *Assistant Professor of Physics.*
 B.A., Rice University, 1958; M.A., Duke University, 1962; Ph.D., Rice University, 1965.

REV. KARL A. MARING, S.J., PH.D., *Professor of Physics.*
 A.B., Woodstock College, 1915; A.M., ibid., 1916; Ph.D., St. Louis University, 1932.

LAWRENCE J. STROHMEYER, M.S., *Associate Professor of Physics.*
 B.S., Loyola University, New Orleans, 1938; M.S., New York University, 1940.

The University

The Jesuits arrived in New Orleans in 1847 for the purpose of establishing a college of liberal arts and sciences. A college preparatory academy and the College of the Immaculate Conception were established on February 1, 1849, at the corner of Baronne and Common Streets. In 1904 an Academy and College were opened on St. Charles Avenue opposite Audubon Park, and the two associated institutions were known as Loyola College.

In 1911 the College of the Immaculate Conception was united with Loyola College on the present Loyola campus. Loyola College was expanded to become Loyola University in the fall of the same year. Loyola University was duly incorporated by the General Assembly of Louisiana and empowered to grant all university degrees in 1912.

Although courses at the graduate level had been offered since 1886, the Board of Directors of the University suspended all graduate work in 1937. As the result of the work of a University Committee appointed by the President in September, 1949, to study the need of offering graduate work, the Department of Education was expanded to offer work at the graduate level for teachers, leading to a degree of Master of Education.

In subsequent years the Board of Directors of the University authorized the Department of Biological Sciences to offer graduate work leading to a Master of Science Degree in Biological Sciences, the Departments of Chemistry, Mathematics, and Physics to offer graduate courses leading to Master of Science Degree in Teaching, and the College of Business Administration to offer a Master of Business Administration Degree.

The liberal arts college of Loyola University is conducted to promote the intellectual, moral, and aesthetic advancement of its students.

A liberal education at Loyola University endeavors to produce the mature development of the student through a carefully integrated liberal arts curriculum. This curriculum includes a liberalized introduction to a special area of learning selected by the student. In this way, adequate provision is made for a student's advancement into scholarly or professional studies.

The curriculum is designed to develop habits of clear, logical, and accurate thinking through such courses as logic, mathematics, and the natural sciences; the ability for clear and forceful self-expression through such courses as composition, language, and public speaking; a knowledge of human nature through courses in literature; a knowledge of the past through courses in history; a knowledge of the present, a contemporary social awareness, and an attitude of social and civic responsibility through courses in social sciences and modern history; a clear knowledge and appreciation of ultimate religious, philosophical, and moral values through courses in theology and philosophy.

COMPUTER CENTER

The University operates an IBM electronic computer center located in Stallings Hall. A new Computer Center will be housed in the science complex now under construction. The computer is used exclusively for graduate and undergraduate students in educational and research projects.

TUITION LOANS

The University participates in the National Defense Student Loan Program. Fulltime graduate students may borrow up to \$1000 per year. Interest is 3% per year. Students are given 10 years in which to repay. Interest and payments do not begin until the student is graduated or stops his college program. For students who subsequently teach, 10% of the loan is written off for each year taught in a public school up to five years.

HONORARY FRATERNITIES AND ORGANIZATIONS

In order to give recognition and encouragement to high standards of scholarship among the students, honorary scholastic fraternities and organizations have been established on the campus.

BETA ALPHA Psi

The purposes of this national, professional and honorary fraternity are: to stimulate interest and cooperation in accounting; to encourage and foster the ideal of service as the basis of the accounting profession; to promote the study of accountancy and its highest ethical standards; to act as a medium between professional men, instructors, students and others who are interested in the development of the study or profession of accountancy; to develop high moral, scholastic and professional attainments in its members; and to encourage cordial intercourse among its members and the professional generally. Accounting majors of junior standing with a 3.00 quality point average in four completed accounting courses and a 2.50 average in all other subjects shall be considered for election to membership. Graduate students who achieve high scholastic standing are also eligible.

BETA GAMMA SIGMA

The purposes of this national honor society are: to encourage and reward scholarship and accomplishment among the students of business administration; to promote the advancement of education in the art and science of business and to foster integrity in the conduct of business operation. Only seniors who rank in the upper tenth of their graduating class and juniors among the highest four percent of their class are considered for election to membership. Graduate students who achieve high scholastic standing are also eligible.

KAPPA DELTA Pi

Kappa Delta Pi is an honor society in education. Here at Loyola, Zeta Rho Chapter, which was established on October 8, 1949, taps those undergraduates who achieve a quality point average of 3.3 and graduate students who earn a quality point average of 3.5. Kappa Delta Pi has as its journal, THE EDUCATIONAL

TIONAL FORUM, which is one of the leading scholarly journals in education. Kappa Delta Pi's main objective is "to encourage high professional, intellectual and personal standards and to recognize outstanding contributions to education."

RHO PHI THETA

Rho Phi Theta is a mathematics fraternity. Its objectives are identical with those of Pi Mu Epsilon, the National Honors Mathematics Fraternity: the promotion of scholarly activity in mathematics among students in academic institutions and among the staffs of qualified non-academic institutions.

TRI BETA

The Eta Lambda chapter of Tri Beta, national honor biology Society, was established at Loyola on March 24, 1956. It unites biology, pre-medical, pre-pharmacy, pre-dental, and medical technology students into a single group who possess a common interest in biology. Its purpose is to instill in its members a desire for scientific knowledge, research and truth.

The Graduate Division of Biological Sciences

Rev. John H. Mullahy, S. J., Ph.D., *Chairman*

PURPOSE

The graduate program in the Biological Sciences is designed to provide a broad training for those who aspire to be teachers and for those who wish to improve their biological background by additional subject matter. The studies in this program provide an excellent preparation for advanced research and doctorate work. The program provides facilities for advanced courses in each of the three branches of the Department of Biological Sciences. At the present time the program leads to the Master of Science degree in Biological Sciences.

ADMISSION

Any student who has a Bachelor's degree from a recognized college and has undergraduate training in general biology, general bacteriology, and organic chemistry may qualify for the Master of Science degree in Biological Sciences.

Applications for admission must be filed with the Graduate School one month before the beginning of the session when the student plans to begin graduate work. The applicant for admission must write to the Registrar of each college previously attended and request an official transcript *in duplicate* of all undergraduate and graduate work. The transcript must be sent directly by the college to the Graduate School, Loyola University, New Orleans, Louisiana 70118. If the applicant for admission attended Loyola University as an undergraduate student, received his degree from Loyola University, and attended no other college or university after he received this degree no additional transcripts of work are required. Applicants are obliged to take both the general section and advanced section of the Graduate Record Examination and to submit the results to the Graduate School before they can be accepted.

The Application for Admission and the transcripts of previous work are reviewed by the Executive Committee of the De-

partment of Biological Sciences and the applicant is then notified of its action by the Graduate School.

For the first twelve hours of graduate work all students are accepted only on a provisional basis. Upon the satisfactory completion of this work (i.e. with a "B" average) the student becomes a classified graduate student. The Executive Committee of the Department of Biological Sciences has the final right to admit students to this category.

Candidates must demonstrate, by written examination if necessary, that they have a reading knowledge of at least one modern foreign language. In all cases the Executive Committee of the Department of Biological Sciences will determine this necessity.

In rare instances the Executive Committee of the Department of Biological Sciences may accept up to six semester hours of graduate credit from other recognized institutions.

RESIDENCE

Requirements are the same as those in the Graduate School of Education.

COURSE REQUIREMENTS

All students are obliged to complete at least one graduate course in each of the three main divisions of the department; viz, Botany, Zoology, and Microbiology. Other courses for a total of 24 hours are at the students' discretion, but it should be noted that all advanced courses in microbiology require at least one course in biochemistry as a prerequisite.

All graduate students are required to participate actively in the graduate seminar each semester that they are enrolled in the Graduate Division. This applies to both enrollment for course work and for thesis research.

The Master of Science degree in Biological Sciences requires twenty-four hours of course work and a thesis. A total point-hour ratio of 3.00 is required for course work. This ratio is computed on the basis of four quality points for an "A", three quality points for a "B", and two quality points for a "C". No quality points are given for the mark of "F".

Along with the course requirements noted above, the candidate must present an acceptable thesis based at least partially on original research. This thesis must be completed and accepted by the Executive Committee of the Department one month before the date of graduation.

All graduate students are expected to gain some supervised teaching experience as part of their preparation for the Master of Science degree.

LIMIT OF TIME

Work completed more than six years before the date on which the Master's degree is to be conferred will not be accepted in fulfillment of requirements for the degree.

FEES

Fees for full-time students (8-12 hours) \$250.00; for part-time students, fees are the same as those for the College of Arts and Sciences.

The tuition fee for all part-time courses is \$35.00 per semester hour, except for accredited teachers and members of a religious community.

For accredited teachers who are at present engaged in teaching, the tuition fee is \$28.00 per semester hour. The teacher's certificate accompanied by a statement of present employment should be presented to the Registrar for inspection at the time of registration.

For students who are members of a religious community, the charges are \$21.00 per semester hour.

A non-refundable application fee of \$10.00 payable to Loyola University must accompany an application for admission to the program.

A registration fee of \$5.00, a library fee of \$5.00 and a laboratory fee of \$10.00 per semester for each course having laboratory periods are charged each semester.

COURSES FOR QUALIFIED SENIORS AND GRADUATE STUDENTS

Bl. 403—Cytology

A study of the morphological, physiological, and biochemical properties of component parts of animal and plant cells. Prerequisite: General Biology. 4 sem. hrs.

Bl. 404—Phycology

A survey of the algae including both marine and freshwater forms.
Prerequisite: General Botany. 4 sem. hrs.

Bl. 407—Limnology

A study of the physical, chemical, and biological factors determining biological productivity in inland waters. Field study of local lakes and streams gives the student experience in the use of methods and instruments for environmental analysis. Two lectures and six hours of laboratory or field work per week. Prerequisite: General Biology. 4 sem. hrs.

Bl. 408—Entomology

The taxonomy, life histories and general ecological relationships of the insects in general and especially of South Louisiana. Two hours lecture and four hours of laboratory or field work per week. Prerequisite: General Biology. 4 sem. hrs.

Bl. 409—Bio-Ecology

The relationships of animals to each other, to plants, and to the physical and chemical factors of the environment. Two lectures and six hours of laboratory or field work per week. Prerequisite: General Biology. 4 sem. hrs.

Bl. 410—Field Zoology

The taxonomy, life histories and general ecological relationships of the common animals (exclusive of the terrestrial insects, the birds, and the mammals) of South Louisiana and the New Orleans area particularly. Two hours lecture and six hours laboratory or field work per week. Prerequisite: General Biology. 4 sem. hrs.

Bl. 411—General Parasitology

A study of parasites in relation to disease. The various types of parasites, their life histories, and the conditions which they cause will be considered. Prerequisite: General Biology. 4 sem. hrs.

Bl. 412—Physiology of the Bacteria

Lectures, assigned reading, discussion and laboratory exercises dealing with the chemistry and physiology of microbial cells. Prerequisite: Bl. 301 and bio-chemistry. 4 sem. hrs.

Bl. 413—Advanced Genetics

Lectures, assigned reading, discussions and laboratory dealing with the molecular, organismic and population aspects of modern genetics. Prerequisite: Bl. 312 or its equivalent. 4 sem. hrs.

Bl. 415-16—Advanced General Physiology

The physiology and biochemistry of cells and the comparative physiology of muscular, nervous and circulatory systems. Bio-electric activities, metabolic cycles, and internal secretions will be covered. Prerequisite: Bl. 303. 8 sem. hrs.

Bl. 417—Endocrinology

General consideration of the organs of internal secretion. Phylogeny, embryology, microscopic anatomy and physiology. 4 sem. hrs.

Bl. 418—Advanced Endocrinology

Recent advances in the biology of the organs of internal secretion. Lectures, conferences and laboratory work. 4 sem. hrs.

Bl. 420—Plant Anatomy

A consideration of the structure and development of seed plants (Primarily Angiosperms). Reference will be made to the relationships of anatomy and developmental patterns to the physiology and morphogenesis of the organism. The Plant Anatomy seminar will constitute a portion of this course. Prerequisite: General Botany. 4 sem. hrs.

Bl. 422—General Virology

The virus as a biological entity; physical and chemical properties of virus particles; representative animal, plant and bacterial viruses are considered. The rickettsiae are briefly treated. Prerequisite: Bacteriology and Organic Chemistry. 4 sem. hrs.

Bl. 423—Mycology

A survey of the fungi with emphasis on form and structure. Prerequisite: Bl. 301. 4 sem. hrs.

Bl. 424—Techniques in Bacteriology

Consideration and application of current techniques used in bacterial physiology. Qualitative and quantitative determination of metabolites are examined as are methods for studying mutants, respiration, and enzymes. Prerequisites: Bl. 301 and biochemistry. 4 sem. hrs.

Bl. 427—Physiology of the Fungi

A study of the chemical activities of fungi as related to their nutrition growth, reproduction and fermentative ability. Emphasis will be placed on fungi important in industry and agriculture. 4 sem. hrs.

Bl. 428—Plant Physiology

Higher plants will be the principal object of study, with regard to their growth processes, water relations, and photosynthetic activities. The laboratory will illustrate modern techniques of investigation as well as the principles of the discipline involved. A weekly meeting devoted to a discussion of contemporary literature will be a part of the course. Prerequisite: General Biology and Organic Chemistry. 4 sem. hrs.

Bl. 429—Medical Entomology

A study of the arthropod groups of medical importance; their identification, general biology and life cycles; factors affecting man and domestic animals and control measures. Prerequisite: General Entomology. 4 sem. hrs.

Bl. 433—Zoology for Teachers

A teacher-training and review course for those engaged in, or preparing for, teaching high school biology. Emphasis is placed on the collection and preparation of local zoological materials for classroom use. Limited to graduate students in education. Prerequisite: General Zoology. 4 sem. hrs.

Bl. 434—Developmental Biology

Lectures, discussions and laboratory work, including original research in such areas of developmental biology as fertilization, nucleocytoplasmic interaction during development, biochemical development and developmental genetics. 4 sem. hrs.

Bl. 435—Morphogenetic Movements

The various morphogenetic movements of cells and tissues during development, the different theories advanced to explain the mechanisms controlling these movements and the experiments to test these theories will be studied. Original research in this area will be taken up in the laboratory. 4 sem. hrs.

Bl. 444-445—Graduate Seminar

Prerequisite—advanced standing. 2 sem. hrs.

Bl. 453—Radiation Biology

A survey of the nature, measurement, and effect of ionizing radiations in biological systems. Designed to acquaint the beginner with theory and methods of use of radiation as a research tool. Geiger counter techniques will be used primarily; absorption and half-life experiments, tracer methods, biological uptake and distribution, isotope dilutions and similar topics will be covered in lectures and in laboratory. Prerequisite: Discretion of professor in charge of the course. 4 sem. hrs.

Bl. 501-502—Research in Bacteriology 4 sem. hrs.

Bl. 503-504—Research in Cytology 4 sem. hrs.

Bl. 505-506—Research in Plant Anatomy 4 sem. hrs.

Bl. 507-508—Research in Animal Ecology 4 sem. hrs.

Bl. 511-512—Research in Parasitology 4 sem. hrs.

Bl. 515-516—Research in Physiology 4 sem. hrs.

Bl. 521-522—Research in Virology 4 sem. hrs.

Bl. 529-530—Research in Entomology 4 sem. hrs.

The Graduate Division of the College of Business Administration

G. Ralph Smith, Ph.D.—*Director*

PURPOSES

The Master in Business Administration program is addressed to the education of qualified students in order that they may assume increased responsibilities and may initiate well predicated research into business processes.

Graduates of the program will be prepared to direct and develop enterprises whose objectives and accomplishments are consonant with the ideals and increasing complexity of Western Culture.

It is intended also to prepare individuals to become teachers at colleges and universities whose curricula are designed to develop leaders with an appreciation of the functions and role of business in maintaining a free enterprise society.

The program is also of sufficient breadth and depth to provide a foundation for persons seeking more advanced degrees.

ADMISSION

Admission to the M.B.A. program is based upon the candidate's having a baccalaureate degree from a recognized institution, an undergraduate record of "B" or better, and personal qualifications of sound character and intellectual attainment. Applicants having less than a "B" undergraduate record may be granted conditional admission as explained below in this section.

Additionally, the candidate must achieve a satisfactory score on either the Miller Analogies Test or the Admission Test for Graduate Study in Business.

Application forms may be secured from the Graduate School, Loyola University, New Orleans, Louisiana 70118. They must be accomplished in duplicate and returned directly to the Graduate School.

The applicant must request from the Registrar of each institution previously attended an official transcript *in duplicate* of all undergraduate, and where applicable, all graduate courses. These transcripts are to be sent directly to the Graduate School of Loyola University.

If the applicant graduated from Loyola University and attended no other college or university either before or after graduation, no additional transcripts are required.

The Graduate Studies Committee reviews the applicant's collegiate record, class standing, and evidences of serious intent and past accomplishments.

If its findings are favorable, the applicant is directed to either take the Miller Analogies Test or have the Educational Testing Service transmit to the Director of the Graduate Division his score on the Admission Test for Graduate Study in Business.

The Committee's findings noted above plus the score achieved on either test determine whether or not the applicant is admitted.

An applicant with less than a "B" average in undergraduate work who achieves a superior score on either of the qualifying examinations may be admitted provisionally at the discretion of the Graduate Studies Committee. Conditional admission for any other reason is also at the discretion of the Graduate Studies Committee.

RESIDENCE

Loyola University confers a degree only on those persons who have completed an entire academic year of satisfactory work under the guidance of the University. The student must take all his graduate courses at Loyola University.

In certain instances the Graduate Studies Committee may be petitioned to accept a maximum of six semester hours of graduate work satisfactorily accomplished at another recognized college or university. Acceptance of advanced standing will be determined exclusively by the Graduate Studies Committee.

The status as a full-time student is determined by the Director. It will reflect whether the candidate is registered in the core curriculum courses or courses open only to graduate students. Regardless of the type of course enrollment all candidates are considered as graduate students.

Part-time students will ordinarily be limited to a maximum of six graduate hours during any one semester. Part-time candidates completing core requirements may exceed this semester hour limitation with the approval of the Director.

ATTENDANCE

If the professor of any graduate level course believes a candidate's record of attendance is such as to jeopardize the satisfactory completion of the course, the Director will notify the candidate in writing of this professorial belief.

Continued unexplained, unsatisfactory attendance will cause the Graduate Studies Committee to review the candidate's standing in the program.

LIMIT OF TIME

Requirements for the degree must be met within four years from the date the candidate first registers for a course numbered 500 or over. If circumstances preclude accomplishment of the requirements within the prescribed period, the candidate may petition the Graduate Studies Committee for permission to continue his work. No more than two petitions will be accepted.

CURRICULUM

The curriculum is designed to provide for possessors of baccalaureate degrees in business and in arts, sciences, and engineering.

Candidates holding degrees in business usually may enter directly into a thirty hour program of graduate work.

All other candidates are required to complete up to thirty hours of study in economics, accounting, finance, statistics, business law, marketing, and management. These courses constitute the core curriculum.

Appropriate credit will be granted for satisfactory work in these areas taken by candidates in any recognized baccalaureate degree program.

All candidates during the final thirty hours of work are required to complete twelve semester hours of the following courses:

B.A. 500 Elements of Behavioral Sciences

Eco. 500 National Income and Employment Analysis

Eco. 501 Studies in Business Cycle Theories

Mg. 502 Managerial Economics

The remaining eighteen hours may be selected from the courses which will provide professional competence in the area of a student's major interest. The functional fields are in accounting, economics, finance, management, and marketing. Each candidate will select courses from no less than two of the functional fields.

Candidates may also select courses from those in the Business Administration series numbered 500 or above.

The requisite number of course hours in the selected functional fields with any other electives is determined by the student only with the advice and consent of his advisor. No other program determination is acceptable.

COURSE REQUIREMENTS

The candidate must achieve a "B" (3.0) average by the end of twelve semester hours of graduate level courses. This average must be maintained during the remainder of the program.

The Director will withdraw the candidacy of any student who has not achieved a "B" (3.0) average at the conclusion of the first twelve hours of graduate level courses. Additionally, any candidate whose average at the conclusion of the first six hours of graduate level courses indicates a satisfactory average cannot be achieved by the twelve hour limit will be denied further registration in the program.

Candidates completing core requirements preparing for entrance into graduate courses must meet the academic standards of the College of Business Administration. Courses numbered 500 or over are reserved exclusively for graduate students.

COMPREHENSIVE EXAMINATION

A comprehensive written examination covering the required and selected functional fields shall be passed by the candidate at the conclusion of the course work. Comprehensive examinations are scheduled regularly in April, July and December.

A candidate who is registered, at the time the examination is scheduled, for *no more* than his final six hours of course work may request permission to take the examination at one of the above times. Permission to take the examination at times other than those regularly scheduled must be sought through a petition submitted to the Graduate Studies Committee. The acceptance of the petition is reserved to this Committee solely. An oral examination may be required also at the discretion of the Graduate Studies Committee.

Application for this examination is to be filed with the Director within four weeks after the beginning of the semester in which the degree is sought.

If the degree is deferred pending another examination, an interval of one semester, not including a summer session, must elapse before another comprehensive examination may be taken.

The second examination for the Master's degree is final. A petition for a third examination will not be entertained.

The term examination is construed to mean the entire comprehensive. Individual parts not passed may be retaken at the discretion of the Graduate Studies Committee.

TUITION AND FEES

Tuition for both full- and part-time students enrolled in courses in the 400 and 500 series is \$80.00 per three credit hour course. Tuition for both full- and part-time students completing the core curriculum requirements is computed at the credit hour rates prescribed by the College of Business Administration or Evening Division as appropriate.

A matriculation fee of \$5.00 is charged the first time a candidate is enrolled unless he has previously enrolled in a degree program of any school or division of Loyola University.

A registration fee of \$5.00 and a library fee of \$5.00 are charged each semester the candidate is enrolled.

A non-refundable application fee of \$10.00 payable to Loyola University must accompany an application for admission to the program.

A fee of \$25.00 is charged any candidate who registers for the comprehensive examination only. If the student is registered for any course constituting a part of his program, this fee is waived.

A University fee of \$25.00 is payable as designated by the Finance Office during the semester or summer session in which the candidate expects to have his degree conferred.

A Cap and Gown Deposit of \$30.00 is paid as designated by the Finance Office. It applies only to persons having the degree conferred at the Spring Commencement. If the Cap and Gown are returned in good condition immediately after the graduation \$25.00 will be refunded. If they are returned more than two months after graduation \$10.00 only will be refunded.

PETITIONS

All student communications to the Graduate Studies Committee should be prepared in consultation with the Director, on the appropriate petition form available from his office.

The petition should be used for seeking the waiver of any requirement of the Graduate Program or requesting review by the Graduate Studies Committee of any action taken by it or the Director relative to the petitioner.

GRADES

The grading scale used is A, B, C, F (failure), I (incomplete), and W (withdrawn). Grade point averages are computed on a four point scale: A=4 points; B=3 points; C=2 points.

Students who for valid and pertinent reasons cannot meet all the requirements for the satisfactory completion of a course during its scheduled period of instruction must arrange with the instructor to receive a grade of incomplete (I) for the course. Failure to make this arrangement will result in a grade of failure (F) for the course.

Grades of incomplete which are not removed within one year from the date on which the course began are automatically converted to failure (F) on the student's record.

Official grade reports are issued by the Registrar of the University. Official transcripts of courses and credits may be obtained from the Registrar. One transcript is provided to the student at no cost. Each additional copy costs \$2.00, except that if more than five are requested at any one time the charge for the third and subsequent copies is \$0.50 each.

CLASS MEETINGS

Classes in the 400 and 500 series meet for one session of two and one half hours duration each week. The instructor has the privilege of lengthening this period if he deems it necessary. Additional sessions may be required at his discretion.

Classes numbered 300 or lower meet as prescribed by the Dean of the College of Business Administration or the Director of the Evening Division.

AUDITING OF COURSES

Any person desiring to audit a graduate level course is charged the regular tuition. Permission must be secured from the Director.

Persons desiring to audit a core curriculum course are charged on the same basis as part-time students of the College of Business Administration. Permission of the Dean of the College of Business Administration is required.

WITHDRAWAL

A candidate wishing to withdraw must comply with the procedures as established by the College of Business Administration.

Withdrawal is initiated with the Director. Tuition refunds are at the discretion of the Treasurer of Loyola University. No refunds will be granted after the first five weeks of the semester have passed.

COURSE OFFERINGS

BUSINESS ADMINISTRATION

B.A. 500—Elements of Behavioral Sciences

A systematic study is made of the fundamental concepts and principles of sociology, psychology, and anthropology as they contribute to the understanding of business activities. 3 sem. hrs.

B.A. 502—Statistical Surveys

The course is designed to familiarize the student through reading and experience with the methods and procedures of statistical surveys. The design and administration (surveys, sampling, the construction of schedules and questionnaires, interviewing, editing, coding, tabulation and evaluation of the data) are considered in detail. 3 sem. hrs.

B.A. 504—Quantitative Decision Methods

The course surveys quantitative methods useful in decision making for managers. Linear programming, probability theory, queuing theory, game theory, and symbolic logic are included. 3 sem. hrs.

B.A. 506—Econometrics

The intent of this course is to introduce the student to some of the basic methods, principles, and problems involved in modern econometric research. 3 sem. hrs.

B.A. 512—Business Ethics

Businessmen are faced with many decisions that involve ethical judgments: fair pricing, gifts, "payola", bribes, call girls, advertising, credit practices, industrial relations, codes of ethics, etc. This course offers case studies of modern business decisions and their social consequences. 3 sem. hrs.

ACCOUNTING

Acc. 500—Contemporary Accounting Theory and Problems I

An analysis and evaluation is undertaken of currently acceptable accounting standards and conventions with emphasis placed upon pronouncements of authoritative groups. Contemporary problems are related to the application of these standards and conventions.

3 sem. hrs.

Acc. 501—Contemporary Accounting Theory and Problems II

Standards and techniques underlying the preparation of consolidated financial and operating statements are studied. Contemporary problems relating to consolidations are included.

3 sem. hrs.

Acc. 502—Advanced Auditing

Auditing techniques and procedures in relation to contemporary problems and acceptable auditing standards are studied.

3 sem. hrs.

Acc. 508—Advanced Cost Accounting

An interpretation and evaluation of concepts of production and distribution costs are studied for managerial control purposes.

3 sem. hrs.

Acc. 510—Research in Taxation

The methodology of research in Federal income taxation is examined. Emphasis is placed on applied research to tax problems. The intent is to develop research techniques and the ability to reach conclusions and to make recommendations predicated upon a synthesis of code, regulations, and court decisions.

3 sem. hrs.

Acc. 520—Seminar in Accounting

Selected problems and topics in accounting are examined. Permission of the graduate faculty in accounting is a prerequisite.

3 sem. hrs.

Acc. 522—Tutorial in Accounting

Individual reading and research in a selected area is conducted under the direction of a member of the graduate accounting faculty. Permission of the individual faculty member is a prerequisite.

3 sem. hrs.

ECONOMICS

Eco. 500—National Income and Employment Analysis

The course treats systematically the concepts and methods used in national income accounting and reviews theories relevant to national product and income stability.

3 sem. hrs.

Eco. 501—Studies in Business Cycle Theories

The contributions of leading economists to theories of the business cycle are examined.

3 sem. hrs.

Eco. 502—The Structure of Industry

The institutional and market structures and activities of the principal industries of the United States are studied.

3 sem. hrs.

Eco. 504—Wage Theory and Practice

The course covers the wage theories of Ricardo, Mill, and Marx, productivity theories, wage structures, long-run trends in real wages, and the problems of a general wage theory.

3 sem. hrs.

Eco. 506—Social Security

The course is concerned with institutional and economic aspects of social security programs in the United States and selected foreign countries.

3 sem. hrs.

Eco. 508—Advanced Studies in the History of Economic Thought

The principal theoretical analysis and policy recommendations of prominent economists from the Mercantilists to the present are studied.

3 sem. hrs.

Eco. 512—Theory of Economic Development

General theories of economic development, from classic to Keynesian, are explored to serve as a basis for comparison and discussion of the present partial theories of underdevelopment.

3 sem. hrs.

Eco. 513—Economic Development in Underdeveloped Countries

The course consists principally of case studies selected to illuminate the diversity of problems defying theoretical generalization.

3 sem. hrs.

Eco. 515—Advanced Price Theory

A rigorous analysis of the various market structures and the pricing process for commodities and for productive services as taking place within these market forms. A systematic study of the conventional "tools" of the theory of price is included, and also some consideration given to possible divergences between practice and theory in the pricing process.

3 sem. hrs.

Eco. 520—Seminar in Economics

Selected problems and topics in economics are examined. Permission of the graduate faculty in economics is a prerequisite.

3 sem. hrs.

Eco. 522—Tutorial in Economics

Individual reading and research in a selected area is conducted under the direction of a member of the graduate economics faculty. Permission of the individual faculty member is a prerequisite.

3 sem. hrs.

FINANCE

Fn. 500—Problems in Money, Banking and Prices

This course is designed to deal with the organization, functioning, and problems of the present day money and banking system of the United States with particular attention given to the Federal Reserve System.

3 sem. hrs.

Fn. 502—Monetary and Fiscal Problems

A study is made of monetary and fiscal theories and problems in a modern industrial economy; of the role of Central banking; of theories of interest and the rate of interest and of the impact of monetary and fiscal operations on the general economy. Study is directed mainly to domestic facets but international aspects are also considered.

3 sem. hrs.

Fn. 506—Financial Management

The principles of finance are used as the basis for the development of techniques useful in the area of financial management. The vehicle for the accomplishment of this objective is a series of actual and simulated cases involving analysis and decision making by the student.

3 sem. hrs.

Fn. 510—International Finance

Foreign exchange and investment problems are studied intensively. 3 sem. hrs.

Fn. 520—Seminar in Finance

Selected problems and topics in finance are examined. Permission of the graduate faculty in finance is a prerequisite. 3 sem. hrs.

Fn. 522—Tutorial in Finance

Individual reading and research in a selected area is conducted under the direction of a member of the graduate finance faculty. Permission of the individual faculty member is a prerequisite. 3 sem. hrs.

MANAGEMENT

Mg. 500—History of Management Thought

The writings of Owen, Fayel, Follett, Taylor, Sheldon, and other leaders in management thought are studied. 3 sem. hrs.

Mg. 502—Managerial Economics

Economic theory, both qualitative and quantitative, in context with business practices is presented with the intent of demonstrating its value in decision making and forward planning. 3 sem. hrs.

Mg. 508—Data Processing Principles, Methods and Controls
The course is designed to acquaint the student with modern data processing principles, methods, and controls. The student is introduced to actual machine programming and operations in order that he may evaluate types of equipment of solving data processing problems. Accounting control and auditing techniques and problems are discussed. Specific case problems are programmed. 3 sem. hrs.*Mg. 520—Seminar in Management*

Selected problems and topics in management are examined. Permission of the graduate faculty in management is a prerequisite. 3 sem. hrs.

Mg. 522—Tutorial in Management

Individual reading and research in a selected area is conducted under the direction of a member of the graduate management faculty. Permission of the individual faculty member is a prerequisite. 3 sem. hrs.

MARKETING

Mk. 500—Advanced Marketing Management I

An intensive study, analysis and interpretation of management decisions: includes both those which directly control marketing operations, and those which are affected by or dependent upon marketing operations. Marketing concepts pervade and orient the study. 3 sem. hrs.

Mk. 501—Advanced Marketing Management II

Exploration and study of actual and potential applications of mathematical models and related techniques and disciplines in marketing management decision making. College algebra and business statistics are prerequisites. 3 sem. hrs.

Mk. 502—Marketing Problems

Current marketing situations are studied and appraised. The application of evolving marketing concepts in solving the problems thus exposed is intensive; due regard is given to the concurrent economic, political and social developments and trends. 3 sem. hrs.

Mk. 504—Development of Marketing Theory

The emergence and evolution of marketing theory in 19th century economic literature are explored. This provides the basis for the critical and intensive study of current trends in its continuing development during the 20th century. 3 sem. hrs.

Mk. 520—Seminar in Marketing

Selected problems and topics in marketing are examined. Permission of the graduate faculty in marketing is a prerequisite. 3 sem. hrs.

Mk. 522—Tutorial in Marketing

Individual reading and research in a selected area is conducted under the direction of a member of the graduate marketing faculty. Permission of the individual faculty member is a prerequisite. 3 sem. hrs.

CORE CURRICULUM COURSES

Courses in the 400 series are open to qualified undergraduates and to graduate students who have not had undergraduate work in the areas represented by the courses. Courses in this series *cannot* be substituted for any course numbered 500 or over.

Course descriptions, other than for 400 series courses, are in the College of Business Administration, Loyola University Bulletin.

B.A. 400—Statistics

The course concentrates on statistical methods with particular reference to their application in business. Sources and collection of data and sampling procedures are studied. Included also are statistical measures and tests for validity and reliability, the construction and use of index numbers, problems of time series, regressions and correlations. 3 sem. hrs.

B.A. 402—Financing of Business Enterprises

The functions of money and the nature of the monetary and banking systems of the United States are reviewed. The financing and concomitant requirements for organizing and establishing business enterprises are studied. The financial policies of corporations are emphasized. 3 sem. hrs.

B.A. 404—Mathematics Applied to Business and Economics

This course treats a wide variety of examples of modern mathematics used in solving business problems and formulating economic theory. 3 sem. hrs.

MONTHLY PUBLICATION

Social Digest, a monthly magazine published by the Graduate Division of the College of Business Administration, prints original studies and excerpts from books and speeches dealing with business, education, ethics, family, law, psychology, public life, and sociology. The magazine is edited by Dr. Hubert F. Schiffer, S.J., professor of economics, and has an average monthly circulation of 7,100, with readers in all states and 55 foreign countries. The subscription price is \$3.00 a year (402 pages).

Graduate Division of Education

Rev. Joseph B. Tremonti, C.S.V., Ed.D., *Chairman*

PURPOSE

The Graduate Division of the Department of Education is organized to offer advanced courses to members of the teaching profession for the purpose of understanding and analyzing the fundamental problems involved in the work of teaching, to acquire proficiency in the techniques of such understanding and analysis, and to become acquainted with the attempts of others toward the solution of these problems.

It is designed to offer preparation for the positions of elementary and secondary principals, supervisors, guidance counselors, and reading specialists in public, parochial and private schools, and for advanced preparation for elementary and secondary teachers.

ADMISSION

The Graduate Division of the Department of Education offers courses of instruction leading to the degree of Master of Education for properly qualified students who have been admitted as classified graduate students. Applications for Admission must be filed with the Graduate School one month before the beginning of the session when the student plans to begin graduate work. The applicant for admission must write to the Registrar of each college previously attended and request an official transcript *in duplicate* of all undergraduate and graduate work. These transcripts must be sent by the college to the Graduate School, Loyola University, New Orleans, Louisiana 70118. If the applicant for admission attended Loyola University as an undergraduate student, received his degree from Loyola University, and attended no other college or university after he received this degree no additional transcripts of work are required.

The Application for Admission and the transcripts of previous work are reviewed by the Executive Committee of the Department of Education. If these are approved by the Executive Committee, the applicant is then allowed to take the qualifying examination prescribed by the Department. The applicant is informed of this action and of the date and the

time of the qualifying examination. Admission is based on the record of all previous work and the results of the qualifying examination. This admission must be obtained before admission to class.

For the first twelve hours of graduate work all students are accepted only on a provisional basis. Upon the satisfactory completion of this work (i.e. with a "B" average) the student becomes a classified graduate student. The Executive Committee of the Department of Education has the final right to admit students to this category.

A classified graduate student is one who has received the Bachelor's degree from a recognized college with a major in education, who has no prerequisite undergraduate work to make up, who has completed the upper division work satisfactorily (i.e. with a mark of "B" or better) in the undergraduate major in education, who is following a program of studies leading to an advanced degree, and who has been admitted by the Executive Committee of the Department of Education as a classified graduate student.

Applicants possessing degrees other than education are eligible for admission to the graduate program in education providing they have completed the education requirements for state certification or their equivalent.

A number of properly qualified out-of-course students may be admitted to take specific courses for graduate credit provided that the applicant has filed an application for admission and official transcripts of previous academic work with the Graduate School in ample time to receive notification of admission as an out-of-course student.

Among these may be students already possessing a Master's Degree and wishing to pursue the thirty hours beyond the Master's level in order to receive salary increments. Students in good standing who are teachers pursuing hours beyond the Master's level may schedule 6 semester hours of graduate work during a semester plus nine hours in the summer by attending the six and three week terms.

Upon the successful completion of all course work and with the approval of the Executive Committee of the Department of Education, a classified graduate student is permitted to make application for the comprehensive examination. This ap-

plication must be filed not later than two weeks after the opening of the semester in which the degree is sought.

NOTE

An undergraduate student of Loyola University who lacks not more than six semester hours of credit for a Bachelor's degree and who has attained an average of "B" or better in the upper division work of his undergraduate major in education may, upon the recommendation of his Dean and with the approval of the Executive Committee of the Department of Education, register for a maximum of six semester hours of graduate work provided that he meets all other requirements for provisional registration and provided that the total program of courses for credit and non-credit in graduate and undergraduate work does not exceed twelve semester hours.

ADVANCED STANDING

Loyola University does not confer a degree upon anyone who has not completed an entire academic year of satisfactory work under the guidance of the University. For the integration of the graduate program, the student should take all of his graduate courses for his Master's degree at Loyola University. A maximum of six semester hours, however, may be accepted in exceptional instances by the Executive Committee of the Department of Education.

LIMIT OF TIME

Work completed more than six years before the date on which the Master's degree is to be conferred will not be accepted in fulfillment of requirements for the degree.

RESIDENCE

For the degree of Master of Education, one academic year of residence is required in a program of at least 30 semester hours of graduate work. This work must include one semester, or its equivalent in summer terms, as a full-time student. Ordinarily two summer terms will be interpreted as meeting this minimum requirement. Not more than twelve semester hours may be scheduled by a full-time student in any one semester. A full-time teacher may schedule no more than 6 semester hours of graduate work during a semester. In the summer session 6 semester hours of graduate work may be scheduled for the six-week term and three hours during the three-week term.

COURSE REQUIREMENTS

The candidate must complete thirty semester hours of graduate work in course with a passing mark in each course. The mark, "A", indicates excellent or superior work. The mark, "B", indicates satisfactory work acceptable for graduate credit. The mark "C" indicates passing but unsatisfactory work at the graduate level. The mark "F" is considered a failing grade. A point-hour ratio of 3.00 for graduate work is required for the Master's degree. This computation is based upon four quality points per semester hour for an "A", three quality points per semester for a "B", two quality points per semester for a "C", and no quality points for the mark of "F". The quality-point ratio is computed by dividing the total number of quality points earned by the total number of semester hours attempted.

A student who obtains a "C" is automatically placed on probation and his status is subject to review by the Executive Committee.

A student who earns an "F" in a required course would have to repeat the course and earn a grade of "B" or better.

Any student earning two or more "F's" is automatically dropped from the degree program and will be ineligible to take courses in the Department of Education.

COMPREHENSIVE EXAMINATION

A comprehensive written examination covering Philosophy of Education and the major field of work shall be passed by the candidate upon completion of his course work. Comprehensive examinations are scheduled regularly in April, July and December.

When performance on the written examination is questionable, an oral examination is required of the candidate. When the degree is deferred pending another examination, the next examination must be postponed for a minimum of one semester, or for a longer period at the discretion of the Committee in Charge of the Candidacy. The second examination for the Master's degree is final. If unsuccessful, no further examination will be allowed.

FEES

Fees for full-time students (9-12 hours) \$250.00; for part-time students, fees are the same as those for the College of Arts and Sciences.

The tuition fee for all part-time courses is \$35.00 per semester hour, except for accredited teachers and members of a religious community.

For accredited teachers who are at present engaged in teaching, the tuition fee is \$28.00 per semester hour. The teacher's certificate accompanied by a statement of present employment should be presented to the Registrar for inspection at the time of registration.

For students who are members of a religious community, the charges are \$21.00 per semester hour.

A registration fee of \$5.00 and a library fee of \$5.00 are charged each semester.

A non-refundable application fee of \$10.00 payable to Loyola University must accompany an application for admission to the program.

COURSE PROGRAM

The student's program is planned with his adviser from the full curriculum of graduate courses. A minimum of twelve hours must be completed in one specific area. The areas of specialization include the following: elementary and secondary administration and supervision, guidance, elementary education, and secondary education. This program is subject to the approval of the Executive Committee of the Department of Education.

The program will include the following core courses:

Ed. 401 Philosophy of Education

Ed. 490 Methodology of Educational Research

Ed. 491 Statistics in Education

DEGREE PROGRAMS

MASTER OF EDUCATION IN GUIDANCE AND COUNSELING

As a professional educator with practical experience in the classroom, a future school guidance counselor should have

already acquired a thorough understanding of all aspects of human development and should be reasonably familiar with the educational setting in which he will work. In addition to this basic preparation, the program for school service personnel in the area of guidance and counseling seeks to fulfill the following specific objectives in training school guidance counselors by assisting each candidate: to understand the philosophy of guidance as an integral function in the educational process; to obtain a thorough knowledge of the basic concepts, principles, methods, procedures, and techniques of guidance and counseling; and to become duly certified, competent guidance counselors adequately prepared and completely qualified to implement in the educational setting the knowledge and skills acquired.

The degree program for students specializing in the area of guidance and counseling, exclusive of standards for state certification, prescribes that each student obtain, in addition to the nine-hour core requirements, a minimum of twelve semester hours of credit from among the list of program offerings submitted below. The other nine hours of credit needed to make the total of thirty semester hours for the master's degree may be elective courses. A student may fulfill the State requirements for certification as a Guidance Counselor by completing the five courses marked with an asterisk comprising a total of fifteen semester hours of credit:

<i>*Ed. 470—Principles of Guidance</i>	3 sem. hrs.
<i>*Ed. 471—Analysis of the Individual: Educational Tests and Measurements</i>	3 sem. hrs.
<i>*Ed. 474—Educational and Occupational Information</i>	3 sem. hrs.
<i>*Ed. 475—Counseling</i>	3 sem. hrs.
<i>Ed. 476—Group Guidance</i>	3 sem. hrs.
<i>*Ed. 477—Organization and Administration of Guidance</i>	3 sem. hrs.
<i>Ed. 479—Practicum in Guidance</i>	3 sem. hrs.

MASTER OF EDUCATION IN READING

In addition to the core requirements for the Master's program, all M.Ed. students concentrating in the field of reading will be required to complete the following courses:

<i>Ed. 455-456—Internship in Developmental Reading Methods for the Secondary School Teacher</i>	6 sem. hrs.
<i>Ed. 457—Reading Foundations</i>	3 sem. hrs.
<i>Ed. 460-461—Practicum/Developmental Reading Methods for the Elementary School Teacher</i>	6 sem. hrs.

The remaining six required hours may be selected from the following courses:

<i>Ed. 431—Mental Hygiene and Psychology of Personality Development</i>	3 sem. hrs.
<i>Ed. 443—Advanced Educational Psychology</i>	3 sem. hrs.
<i>Ed. 452—Advanced Child Psychology</i>	3 sem. hrs.
<i>Ed. 453—Advanced Psychology of Adolescence</i>	3 sem. hrs.
<i>Ed. 458—Problems in Teaching Reading</i>	3 sem. hrs.
<i>Ed. 471—Analysis of the Individual: Educational Tests and Measurements</i>	3 sem. hrs.

This program meets the minimum standards for reading specialists as determined by the IRA with this limitation: a minimum of three years teaching and/or clinical experience.

MASTER OF EDUCATION IN ADMINISTRATION

Graduate courses in Administration and Supervision provide experiences that enable the student to gain an understanding of the *processes* of administration and supervision in our changing society; likewise, the important role the principal plays in securing high quality education. The courses further examine the *methods of operation for effective leadership* and thus the student becomes better acquainted with the implication of leadership as well as the power structures, crucial issues, and the current problems involved in school administration and supervision.

In addition to the nine-hour core requirements of the Master's program, twelve hours of courses in the field of administration and supervision are required. The courses in administration and supervision are Ed. 420, Ed. 421, Ed. 422, Ed. 423, Ed. 424, Ed. 425, Ed. 426, and Ed. 432.

For elementary principal or supervisor, the following two courses are required:

<i>Ed. 420—School Administration: Elementary</i>	3 sem. hrs.
<i>Ed. 421—School Supervision: Elementary</i>	3 sem. hrs.

For secondary principal or supervisor, the following two courses are required:

<i>Ed. 422—School Administration: Secondary</i>	3 sem. hrs.
<i>Ed. 423—School Supervision: Secondary</i>	3 sem. hrs.

If individuals wish to prepare for both levels, Ed. 420, Ed. 421, Ed. 422, and Ed. 423 are required.

The suggested electives which would contribute to the program at the elementary level are:

<i>Ed. 440—Elementary School Curriculum</i>	3 sem. hrs.
<i>Ed. 442—Problems in Elementary Education</i>	3 sem. hrs.

The suggested electives which would contribute to the secondary level program are:

<i>Ed. 450—Secondary School Curriculum and Co-curricular Activities</i>	3 sem. hrs.
<i>Ed. 451—Problems in Secondary Education</i>	3 sem. hrs.
<i>Ed. 453—Advanced Psychology of Adolescence</i>	3 sem. hrs.
<i>Ed. 454—The Junior High School</i>	3 sem. hrs.

For certification of parish or city school supervisor or school principal, in addition to the teaching certificate and successful teaching experience, the State of Louisiana requires a Master's degree from a regionally-accredited institution, including twelve semester hours of professional education at the graduate level.

MASTER OF EDUCATION IN ELEMENTARY EDUCATION

Students working for advanced preparation in Elementary Education are required to complete the nine-hour core requirement and twelve hours from the following courses:

<i>Ed. 432—Supervision of Student Teachers</i>	3 sem. hrs.
<i>Ed. 440—Elementary School Curriculum</i>	3 sem. hrs.
<i>Ed. 442—Problems in Elementary Education</i>	3 sem. hrs.
<i>Ed. 443—Advanced Educational Psychology</i>	3 sem. hrs.
<i>Ed. 452—Advanced Child Psychology</i>	3 sem. hrs.
<i>Ed. 457—Reading Foundations</i>	3 sem. hrs.
<i>Ed. 58—Problems in Teaching Reading</i>	3 sem. hrs.
<i>Ed. 460-461—Practicum/Developmental Reading Methods for the Elementary School Teacher</i>	6 sem. hrs.
<i>Ed. 463—Audio-Visual Aids</i>	3 sem. hrs.

The other nine hours of electives may be taken from any graduate courses with the approval of their advisor.

MASTER OF EDUCATION IN SECONDARY EDUCATION

Students working for advanced preparation in Secondary Education are required to complete the nine-hour core requirements and twelve hours from the following courses:

<i>Ed. 432—Supervision of Student Teachers</i>	3 sem. hrs.
<i>Ed. 443—Advanced Educational Psychology</i>	3 sem. hrs.
<i>Ed. 450—Secondary School Curriculum and Co-Curricular Activities</i>	3 sem. hrs.
<i>Ed. 453—Advanced Psychology of Adolescence</i>	3 sem. hrs.
<i>Ed. 454—The Junior High School</i>	3 sem. hrs.
<i>Ed. 455-456—Internship in Developmental Reading Methods for the Secondary School Teacher</i>	6 sem. hrs.
<i>Ed. 463—Audio-Visual Aids</i>	3 sem. hrs.

The other nine hours of electives may be taken from any graduate courses with the approval of their advisor.

EDUCATION COURSE OFFERINGS

Ed. 401—Philosophy of Education

A brief study of the major philosophies, including contemporary movements, which affect educational thought. 3 sem. hrs.

Ed. 402—Comparative Education

A comparison of the most typical educational systems in Europe, Asia, and America pointing out the basic differences in such areas as objectives, curricula, and teaching methods; social and technical changes and their effects. 3 sem. hrs.

Ed. 420—School Administration: Elementary

Principles, policies, practices and problems of elementary school administration; the role and functions of the elementary principal; the improvement of pupil discipline and school-community relations. 3 sem. hrs.

Ed. 421—School Supervision: Elementary

Principles, policies, practices and problems of elementary school supervision; inservice education of teachers; replacement or modification of the assign-study-recite-test scheme of teaching by more modern and defensible teaching techniques. 3 sem. hrs.

Ed. 422—School Administration: Secondary

Principles, policies, practices and problems of secondary school administration; the role and functions of the secondary principal; the improvement of pupil motivation and teacher morale; administering the comprehensive secondary school. 3 sem. hrs.

Ed. 423—School Supervision: Secondary

Principles, policies, practices and problems of secondary school supervision; the aims and objectives of secondary education; coordination, reform and reorganization of the secondary school curriculum. 3 sem. hrs.

Ed. 424—School Administration: Financing Public Education

The development of public support of education in the United States; the role of federal, state, and local government in financing education; principles, practices and problems relative to the sources, distribution, and expenditure of public funds. 3 sem. hrs.

Ed. 425—School Administration: Legal Foundations and Problems

Principles of law as found in Constitutional provisions, typical statutes and decisions of cases as they affect education, public and private, are examined in this course from the viewpoint of governing bodies, administrators, educators, students and those responsible for them. 3 sem. hrs.

Ed. 426—Organization and Administration of Public Education in the United States

The scope and sequence of American Public Education; the role of the federal government, state government, and the local school district in American public education; problems, responsibilities and activities of public school teachers. 3 sem. hrs.

Ed. 431—Mental Hygiene and Psychology of Personality Development

A study of the nature, principles, problems, and techniques of mental hygiene as applied to the personal-social-emotional adjustment of the child in the educational process and of the meaning, structure, components, management, and patterns of adjustment in the psychology of personality development as related to the promotion of good mental health. 3 sem. hrs.

Ed. 432—Supervision of Student Teachers

Role of the supervising teacher in student teaching. For those teachers who are interested in supervising elementary or secondary student teachers. Prerequisite: teaching experience and consent of instructor. 3 sem. hrs.

Ed. 440—Elementary School Curriculum

Comprehensive survey and study of the elementary school program. 3 sem. hrs.

Ed. 442—Problems in Elementary Education

Seminar in problems peculiar to education at the elementary level. 3 sem. hrs.

Ed. 443—Advanced Educational Psychology

A study of the nature of learning and the learning process with emphasis on a critical examination and evaluation of various theories of learning; the factors affecting learning, such as individual differences, motivation, memory, habits, transfer of training, and so on. 3 sem. hrs.

Ed. 450—The Secondary School Curriculum and Co-curricular Activities

Historical development of secondary education in the United States; objectives, purposes, and functions of curriculum including co-curricular activities; principles of curriculum development and re-organization; organization and structure of the curriculum; factors influencing the curriculum. 3 sem. hrs.

Ed. 451—Problems in Secondary Education

A critical analysis of the problems and issues of secondary education today and an appraisal of the proposals for suggested changes and improvements in secondary education. 3 sem. hrs.

Ed. 452—Advanced Child Psychology

A thorough study of child behavior from birth through the elementary school age with reference to the recognition and development of the various traits of personality prior to the onset of puberty.

3 sem. hrs.

Ed. 453—Advanced Psychology of Adolescence

A thorough study of the adolescent personality through the analysis of physical, emotional, social, motivational, intellectual, and volitional developmental changes, behavioral characteristics, basic problems and adjustments.

3 sem. hrs.

Ed. 454—The Junior High School

Current administration, principles and practices essential to the effective organization and management of the junior high schools. Will consider the educational leadership required of the junior high school principalship in such areas as the program of studies, schedule making, instructional materials, student activities, staff relationships, and school-community relations.

3 sem. hrs.

Ed. 455-456—Internship in Developmental Reading Methods for the Secondary School Teacher

Analysis of research; the objectives of developmental reading; how these objectives are achieved; practical experiences with the materials and supplementary equipment used in the field. Experience will be provided with students in large groups, grades 7-12. Summer only. Both courses must be taken together.

6 sem. hrs.

Ed. 457—Reading Foundations

A foundation course designed to explore, in depth, the skills to be developed in a reading program, the grade-placement of these skills, and methods for developing efficiency in the application and usage of these skills.

3 sem. hrs.

Ed. 458—Problems in Teaching Reading

A course to give the classroom teacher, administrator, and reading specialist insight concerning the problems related to retardation in reading. Causes, diagnostic procedures, and remedial methodology for increasing the reading efficiency of children and adolescents will be emphasized.

3 sem. hrs.

Ed. 460-461—Practicum/Developmental Reading Methods for the Elementary School Teacher

For teachers of grades K-6 only. A class-practicum course stressing diagnosis and correction of reading problems at the elementary level and the operation of developmental programs and individualized instruction in reading by the classroom teacher. Courses will include standardized and teacher-made tests. Children will be provided for the practicum. These courses must be taken concurrently. Summer only.

6 sem. hrs.

Ed. 463—Audio-Visual Aids

The organization and administration of an audio-visual program and the effective utilization of audio-visual equipment, materials and techniques.

3 sem. hrs.

Ed. 470—Principles of Guidance

A survey of the history, nature, purposes, functions, principles and practices of organized guidance in our educational system.

3 sem. hrs.

Ed. 471—Analysis of the Individual: Educational Tests and Measurements

A survey of the educational measurement movement; the principles and techniques of constructing and improving teacher-made tests; an appraisal of intelligence, aptitude, achievement, and interest tests relative to their validity, reliability, administration and interpretation. 3 sem. hrs.

Ed. 474—Educational and Occupational Information

A study of various types of published information and multi-sensory materials, various occupational classification systems, methods of collecting, classifying, evaluating, and using occupational information. 3 sem. hrs.

Ed. 475—Counseling

Theories and techniques of counseling with consideration given to the principles, practices, tools, problems, and evaluation of counseling. 3 sem. hrs.

Ed. 476—Group Guidance

The nature, importance, and types of group guidance in a guidance program; an intensive study of the contents, materials and techniques utilized in group guidance. 3 sem. hrs.

Ed. 477—Organization and Administration of Guidance

A careful study of the various types of guidance programs current in theory and practice. This will stress the functions of guidance at the elementary, secondary, college, and adult level. 3 sem. hrs.

Ed. 479—Practicum in Guidance

This course is designed to apply the testing and counseling knowledge and skills acquired in other courses. In classroom discussion trends, issues, professional stature and ethical conduct as well as related services will be emphasized. This should be the last course taken in the student's guidance sequence. 3 sem. hrs.

Ed. 490—Methodology of Educational Research

An extensive study of the methods and tools of educational research with emphasis upon student application of the scientific method through the selection, development, and reporting of a research topic. 3 sem. hrs.

Ed. 491—Statistics in Education

The computation, use and understanding of frequency distributions, measures of central tendency, measures of variability, normal curve, correlation, and statistical inference as applied to education and found in educational literature. Prerequisite: Ed. 490 3 sem. hrs.

Ed. 499—Research Problem in Education

An individual research project, under close supervision of a faculty member, when particular needs of a student cannot be satisfied by the regularly scheduled courses. Prerequisite: Ed. 490. 1-3 sem. hrs.

The Graduate Program in Chemistry, Mathematics, and Physics

The departments of Chemistry, Mathematics, and Physics offer a graduate program uniquely designed for teachers and leading to a Master of Science in Teaching. The program is restricted at present to those who are actually teaching in a secondary school (grades 7-12) or in a junior college. It is designed to improve subject matter mastery in their teaching field and in related sciences, as well as to keep the teachers abreast of modern developments.

ADMISSION

Any teacher who has a Bachelor's degree from a recognized institution and has undergraduate training in his chosen field may be admitted to the degree program. The adequacy of undergraduate training will be determined by the Graduate Committee of the respective Department and based on official transcripts of previous work; on results of a placement examination; and on personal interviews with the applicant.

Admission to the program in every case will be on a provisional basis until at least twelve hours are completed with a quality point ratio of 3.00, that is, a grade of B (satisfactory work acceptable for graduate credit). At the completion of these twelve hours, the student may be admitted by the Graduate Committee to the category of classified graduate student.

Application for admission must be made to the Graduate Committee of the department concerned, Loyola University, New Orleans, Louisiana 70118.

DEGREE REQUIREMENTS

A minimum of 30 and a maximum of 36 graduate semester hours with a quality point ratio of 3.00 (B average) are required. Of these hours, at least 18 must be in the major field and taken at Loyola University. A maximum of 6 hours may be transferred from other recognized institutions with explicit approval of the Graduate Committee. Up to 6 hours may be

taken in the field of Education, the remaining hours may be taken in a related science field.

A working knowledge of mathematics up to and including the Calculus is required; and a reading knowledge of at least one modern foreign language is desirable.

If the degree is to be granted for course work alone, satisfactory performance in a comprehensive examination on all courses is required. In lieu of this comprehensive examination, and with prior approval of the Graduate Committee of the respective department, the Candidate may elect to write a thesis under faculty supervision. In this latter case, an oral "defense" of the thesis, or of the research on which it is based, may take the place of the comprehensive examination.

Each candidate must have satisfactorily completed either the thesis or the comprehensive examination at least three months before the date of graduation.

LIMIT OF TIME

Work completed more than six years before the date on which the Master's degree is to be conferred will not be accepted in fulfillment of requirements for the degree.

Chemistry

M. H. Macdonald, Ph.D., *Chairman*
Anthony DiMaggio, III, Ph.D., *Assistant Chairman*

CHEMISTRY COURSE OFFERINGS

Ch. 401-402T—General Chemistry

This course is taught every year and is the course usually taken by new participants who are not familiar with the CHEM Study or CBA curriculm. Lecture and Laboratory. 8 sem. hrs.

Ch. 403T (Ed. 403)—Principles of Physical Science

This course, offered to lower elementary school teachers, is designed to furnish sufficient background subject matter in basic chemistry and physics to enable them to incorporate meaningful and accurate concepts in physical science into their curricula. Credit is applicable toward the M.Ed. or the M.S. in Science Teaching Degree. Lecture and Laboratory. 6 sem. hrs.

Participants whose backgrounds warrant it may take more advanced courses from the group Ch. 411 through Ch. 499. Two to four of these courses may be taken for a total of eight semester hours a year. All advanced courses will be given in any three-year sequence. During laboratory, oportunities will be available for preparation of molecular models and other demonstration material for use in the participants' own high school classes.

Ch. 411T—Quantitative Analysis

Basic principles and techniques of quantitative analysis including stoichiometry, evaluation of measurements, acid-base equilibria, redox, precipitation, titration, and gravimetric methods. Lecture and Laboratory. 4 sem. hrs.

Ch. 412T—Analytical Chemistry I

Basic principles of analytical chemistry. Separation of ions, volumetric and gravimetric analysis, acidimetry and alkalimetry, redox methods, the use of adsorption indicators, iodimetry, statistical methods applied to analytical chemistry, use of organic precipitants, EDTA, colorimetry, electrometric methods, chromatography. Lecture and Laboratory. 4 sem. hrs.

Ch. 413T—Analytical Chemistry II

An analytical instrumentation course, including spectrophotometry, (IR, visible, UV flame), chromatography (gas, thin-layer, column), electrometric methods and polarography. Lecture and Laboratory. 4 sem. hrs.

Ch. 421T—Organic Chemistry

Covers structural and bonding theory, organic reaction mechanisms, stereochemistry, and type reactions of organic compounds. Modern methods of determining molecular structure. Lecture and Laboratory. 4 sem. hrs.

Ch. 422T—Organic Reactions and Mechanisms

A detailed study of the major type and name reactions. Mechanisms will be discussed using kinetics, thermodynamics, and other physico-chemical principles. Lecture. 3 sem. hrs.

Ch. 423T—Techniques of Organic Chemistry

Selected experiments using apparatus and instruments not normally available in an introductory organic laboratory course. Opportunity will be given to develop demonstrations and experiments suitable for use in high school chemistry courses. Laboratory. 1 sem. hr.

Ch. 431T—Inorganic Chemistry

Nuclear structure and reactions, atomic structure, chemical bonding, and periodicity. Inorganic stereochemistry and reaction mechanisms, acid-base theories, and nonaqueous solvents. Lecture. 3 sem. hrs.

Ch. 432T—Inorganic Chemistry Techniques

A presentation of special laboratory techniques illustrated by carefully chosen syntheses of several types of compounds. Laboratory. 1 sem. hr.

Ch. 441T—Physical Chemistry

The states of matter and kinetic theory, thermodynamics, the laws of solutions, chemical and physical equilibria, chemical kinetics, electrochemistry, colloids, and molecular structure. Lecture and Laboratory. 4 sem. hrs.

Ch. 442T—Colloid Chemistry

Basic principles of colloid chemistry including interfacial phenomena, viscosity, nucleation, lyophilic and lyophobic systems, optical and electrical properties of colloids. Lecture. 3 sem. hrs.

Ch. 443T—Colloid Chemistry

Preparation and coagulation of colloids. Determination of particle size, shape, form, and structure. Laboratory. 1 sem. hr.

Ch. 444T—Thermodynamics

Selected topics from the field of classical thermodynamics including the mathematical derivation of formulae expressing the three Laws of Thermodynamics. Lecture. 3 sem. hrs.

Ch. 451T—Biochemistry

Review of the organic chemistry of carbohydrates, lipids, proteins, and nucleic acids. Enzymology, digestion, metabolism, respiration, and endocrinology. Aspects of clinical chemistry. Laboratory work will include typical reactions and determinations on major biological compounds, selected kinetic experiments on the dynamic aspects of biochemistry, and demonstrations of more refined biochemical techniques. Lecture and Laboratory. 4 sem. hrs.

Ch. 452T—Biochemical Mechanisms

A detailed study of individual reactions involved in the synthesis, degradation, and interconversions of major biological compounds with some emphasis on the physico-chemical aspects. Lecture. 3 sem. hrs.

Ch. 453T—Biochemical Techniques

Selected experiments using apparatus and instruments not normally available in an introductory biochemical laboratory course. Laboratory. 1 sem. hr.

Ch. 455, 456, 465, 466—Advanced Placement Chemistry I, II, III, and IV

Fundamental principles in chemistry are treated in sufficient depth to enable high school teachers to teach a course in chemistry comparable to a freshman college level course. This is a partially sequential Summer Institute program which may be attended for two summers. Lecture and Laboratory. 4 semester hours each for a maximum of 16 semester hours.

Ch. 499T—Research in Chemistry Teaching

Individual or group research aimed at developing and perfecting chemistry experiments, demonstrations, lecture and laboratory syllabi for adaption into high school chemistry courses. 3 sem. hrs.

Mathematics

Rev. John F. Keller, S.J., M.S., *Chairman*

The following courses are especially designed for Teachers of Mathematics according to the Recommendations of the Mathematical Association of America for the Training of Mathematics Teachers. See detailed report of the Committee on the Undergraduate Program in Mathematics and its Panel on Teacher Training in American Mathematical Monthly, volume 67, 1960, pp. 982-991. Also see similar report in The Mathematics Teacher, volume LIII, number 8, 1960.

MATHEMATICS COURSE OFFERINGS

Mt. 401—Foundations of Mathematics

The axiomatic method; theory of sets; infinite sets; countability and cardinality; well-ordered sets; ordinal numbers; mathematical logic; intuitionism; formalism; Hilbert's "proof theory"; Godel's proof. 3 sem. hrs.

Mt. 413-414—Abstract Algebra

Algebraic structures, such as groups, rings, fields, etc. Rigorous proofs emphasizing the axiomatic treatment. 6 sem. hrs.

Mt. 421-422—Introduction to Linear Algebra and Matrices

Systems of linear equations; vector spaces; basic operations for matrices; determinants; bilinear and quadratic functions and forms; linear transformations on a vector space and canonical representations of a linear transformation. 6 sem. hrs.

Mt. 423-424—Linear Algebra

Real, finite-dimensional cases. Concrete manipulation of vectors and matrices. Vector equations and inequalities, intuitive introduction to linear programming and games. Linear functions and transformation, including a thorough understanding of the solution of m equations in n unknowns. 6 sem. hrs.

Mt. 431-432—Foundations of Geometry and Trigonometry

A course designed for a formal development of affine and Euclidian geometry, attempting to present a coherent development of those portions of geometry actually a part of present day mathematics, meeting the standards of rigor of, employing the concepts and procedures of, and attaching naturally to, present day mathematics. The algebra of real numbers is the basis of this geometry. 6 sem. hrs.

Mt. 433-434—Geometry

Foundations of geometry (in the sense of Hilbert). Generalization of the idea of congruence to include rigid motions, that is, one-to-one correspondence preserving distances. A corresponding generalization of the ideas of similarity. Measure theory; familiar area and volume formulas as theorems; Cavalieri's Principle. 6 sem hrs.

Mt. 435—Pure Analytic Geometry

Points, lines, and so on are defined and treated in terms of an algebraic model. This development is based on the fifteen axioms for plane geometry as published in Hilbert's *Grundlagen*. The undefined terms in the axioms — six in number — are shown to be in algebraic correspondence by means of coordinates. 3 sem. hrs.

Mt. 447-448—Probability and Statistics

Probability theory from a set-theoretic point of view, and application of basic probability theory to problems of statistical inference.

6 sem. hrs.

Mt. 453-454—Calculus and Analytic Geometry

A more rigorous treatment of the material in Mt. 353-354 with greater manipulative skills expected. Infinite sequences and series. Elementary differential equations.

6 sem. hrs.

Mt. 493—Programming Mathematical Problems for Digital Computers

Input, output, and storage devices; binary, octal, hexadecimal and other number systems; coding and programming in machine language; flow charts; sequencing; loops and branches; automatic address modification; precision and scaling; subroutines; testing programs; optimum programming; automatic programming; compilers.

3 sem. hrs.

Mt. 494—Numerical Analysis

Ordinary finite differences; divided differences; interpolation; subtabulation; series and integrals; numerical solution of differential equations; linear systems and matrices; solution of linear equations; difference equations; solution of partial differential equations by difference methods; control of errors. Prerequisite: Mt. 493. 3 sem. hrs.

Mt. 499—Research

3 sem. hrs.

Physics

David G. Keiffer, Ph.D., *Chairman*

Special advanced offerings designed specifically for High School Teachers of Physics will be presented as demand and resources permit. These offerings will generally carry graduate credit and will be applicable toward the M.S. (Physics Teaching) degree. Applicants for such degree program must fulfill the general requirements stated on pages 45 and 46 of this bulletin.

PHYSICS COURSE OFFERINGS — 1967-1968

Fall and Spring: Physics 470-471; Physics 484-494.

Ph. 470-471—Introductory Physical Science

A unified laboratory-lecture course designed for teachers of students at the junior high level. This laboratory-oriented course, which had its genesis in the Physical Science Study Committee physics program, is expected to equip students to meet the challenge of the various new senior high school courses in science. The study of matter is the central theme; differences between substances and the idea of quantity are the avenues of approach. Participants have a very active role in the program, observations and experiments being integrated directly and immediately with the lectures and problems.

6 sem. hrs.

Ph. 480-490—The PSSC Program

Lectures and laboratory sessions utilizing materials developed by the Physical Sciences Study Committee, including the PSSC Text, Laboratory Manual, Teachers' Resource Book and Guide, films. 6 sem. hrs.

Ph. 481-491—Foundations of Modern Physics

Historical and philosophical origins of present-day physical theories. Fields and forces. Modern energy-space-time concepts. Selected experiments from Modern and Atomic physics. 6 sem. hrs.

Ph. 482-492—General Physics

A review of the traditional divisions of basic physics with special emphasis on "workshop" participation, general discussion of problems arising in high school classrooms and the analysis and solutions of physical problems. Special experiments and demonstrations by participants according to field of interest. 6 sem. hrs.

Ph. 483-493—Classical Mechanics and Mathematical Methods

A theoretical course based fundamentally on the conservation theorems. Foundations of classical mechanics including statics, kinematics, and dynamics of a rigid body, oscillatory and planetary motion, are treated. Also included are selected topics from thermodynamics and statistics. 6 sem. hrs.

Ph. 484-494—Elements of Electricity and Electronics

Theory, circuitry, and measurements in electricity and electronics. AC and DC nets are considered; solid-state as well as thermionic devices will be treated. Measurements will include resistivity, currents, potentials, capacitance, and inductance. Instrumentation will be adaptable to the high school inventory as far as practicable. Experiments will include oscillators, amplifiers, photo and control devices. 6 sem. hrs.

Ph. 495—Basic Optics and Wave Motion

Geometrical and physical optics using simplified equipment readily available. Fundamental principles, rather than completed optical instruments, will be emphasized. Primarily a laboratory course modeled after the Palmer manual. 3 sem. hrs.

Ph. 496—Atomic Physics

Origin and development of some of the more important concepts of the physics of the 20th Century, with main emphasis being placed on introductory quantum principles, the extra-nuclear structure of the atom, and an introduction to radioactivity and nuclear processes. 3 sem. hrs.

Ph. 497—Introductory Electromagnetics

A presentation from field-theoretical viewpoint. Topics to be presented will include fields, potential, dielectrics, electromagnetics, currents, Maxwell's equations, and waves. The use of calculus and elementary vectors will be presumed. 3 sem. hrs.

Ph. 499—Research

2-4 sem. hrs.

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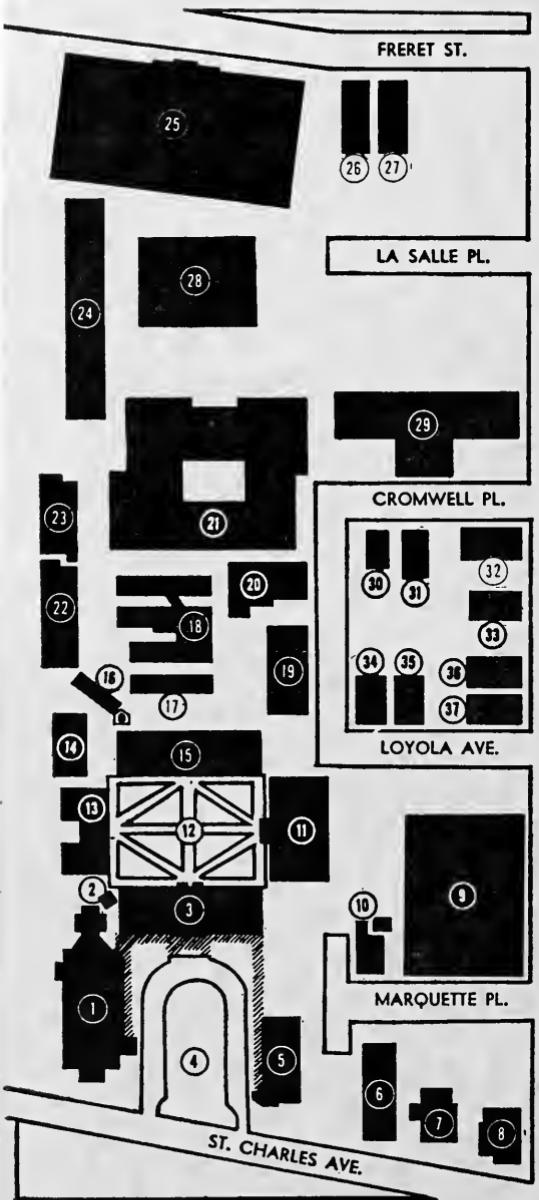
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WEST VIRGINIA

WHEELING COLLEGE, WHEELING

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- 2 Burke Memorial
- 3 Marquette Hall
- 4 Horseshoe
- 5 Thomas Hall
- 6 St. Thomas More Hall (Law)
- 7 Cummings Hall (Education)
- 8 MacDonald Hall (Music)
- 9 Physical Sciences (under construction)
- 10 Medical Technology
- 11 Library
- 12 Quadrangle
- 13 Stallings Hall (Bus. Ad. & M)
- 14 Central Utilities Building
- 15 Bobet Hall (Biological Sciences)
- 16 Animal House
- 17 Dental Annex
- 18 Chemistry Buildings
- 19 Law Annex
- 20 Maintenance Building
- 21 Danna Student Center
- 22 Physics Building
- 23 Physics Annex
- 24 Biever Hall (Men's Residence)
- 25 Field House
- 26 Carey Hall
- 27 Martin Hall
- 28 Buddig Hall (Women's Residence)
- 29 Holy Name Parochial School
- 30 6330 Cromwell (Social Digestive Office)
- 31 6322 Cromwell (Secretarial Sciences)
- 32 Health Research Building
- 33 Alumni Office
- 34 Biological Sciences Annex
- 35 Dental Hygiene, Psychology
- 36 Hynes Hall
- 37 English Department